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System For Optimally Shipping Items To Minimize Costs

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SYSTEM FOR OPTIMALLY SHIPPING ITEMS TO MINIMIZE COSTS

ABSTRACT

A system and method are disclosed that optimally ships items to minimize costs. The method includes receiving by the system an order for the items to be packaged. The system determines various parameters for the order, to provide a parcel recommendation to a packer, which may include determining a possible carrier and rate structure, dimensions, number of items, location, weight of the items, etc. The system uses a suitable optimization model to minimize cost of shipping. The optimization output may be order dimensions including size and weight, and carrier for each package. The system then instructs the packer to pack the items based on linear optimization. The optimally packed items are sent to the carrier. Thus, the system and method reduce shipping costs by optimizing package weight and choice of carrier along with the rate structure for each carrier.

KEYWORDS: parcel weight optimization, parcel rate structure, multiple carriers, e-commerce delivery

BACKGROUND

As e-commerce is becoming more prevalent, carriers for e-commerce sites have increased in number, providing more options to a shipper. Carriers base charges on the weight of each parcel. The carriers' shipping rates have different marginal rate increases at different weights for a parcel. The cost increase of going from a 10 lb. parcel to 11 lbs. is different from a 40 lb. parcel going to 41 lbs. The marginal rate increase from pound to pound often varies between different carriers, which gives room to optimize packaging to save costs.

DESCRIPTION

A system and method are disclosed that provide optimized packaging and shipping based on physical parameters of an ordered item. The system as depicted in FIG. 1 includes a server to receive orders from a customer. The server stores rate structure information for a number of carriers, and includes processor and memory to run the optimization engine that executes the method. The server may output optimal selection of package size, package number, and carrier to minimize costs.

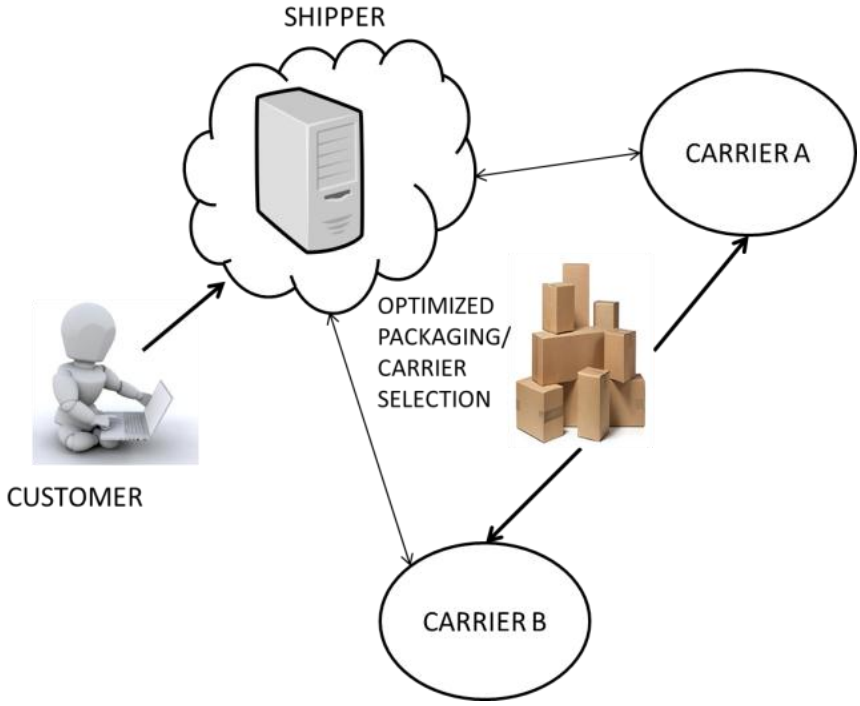

FIG. 1: System for optimally shipping items to minimize costs

The method of optimizing carrier and packaging to minimize shipping costs is shown schematically in FIG. 2. As explained with reference to FIG. 1, the system receives orders for item(s) from the customer in step A. The system determines location (zone or area or region) to which the order is to be shipped, dimensions (size or volume), weight of items and number of items in step B. The system then identifies possible carriers (e.g. Carrier A, Carrier B, etc.) and retrieves rate structures for the carriers to ship the item(s) in step C. The system sends details

obtained from step B and C to an optimizer in step D. In step D the system estimates possible combinations via a numerical optimization technique to identify a suitable package that may result in a lowest shipping cost for the ordered item. The numerical optimization technique could be linear optimization. In the final step E, the system issues packing instructions to the packer. The optimally packed parcels are then sent to the carrier to reach the customer.

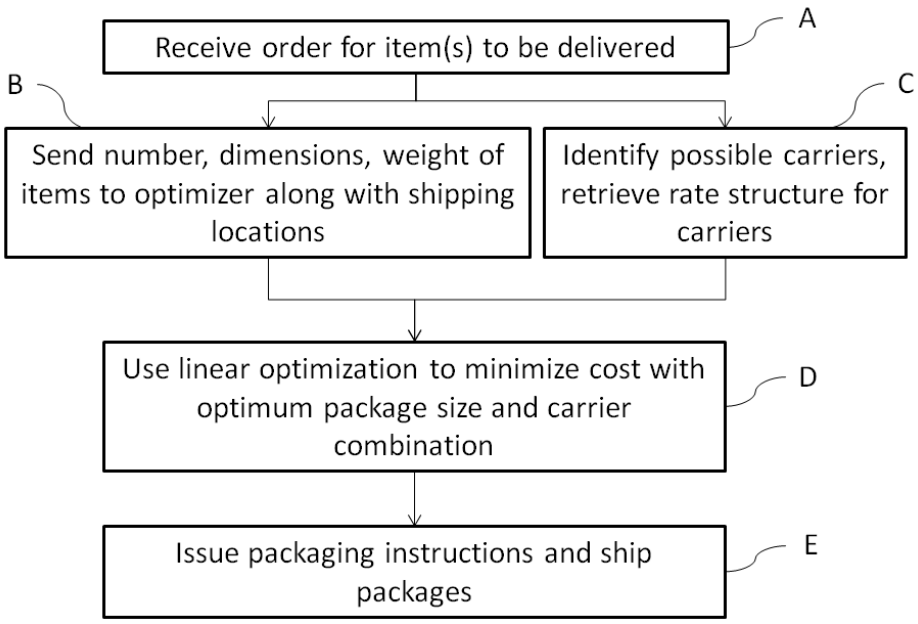

FIG. 2: Method of optimally shipping items to minimize costs

For instance, for shipping a product through carrier A, the method may require creating as many heavy (50 lb) packages as possible (when shipping to Zone 2). For shipping a product through carrier B, the method may require distributing the weight between two parcels as evenly as possible if the order is < 100 lbs (when shipping to Zone 2). If the order is > 100 lbs, the method may require first creating as many heavy (50 lb.) packages as possible, excluding the last two packages, which may be balanced evenly. For example, if a customer places a 120 lb order, the first parcel may weigh 50 lbs. and the second and third packages may weigh 35 lbs. each.

In another example, a packer is given an order with 6 identical items that are 10 lbs each. The system identifies carrier B as a possible carrier to ship the items and retrieves transportation

rates of carrier B. The system determines that each parcel may fit up to 5 of the items. The system collects the dimensions and weights of the ordered item. The system conducts a linear optimization analysis based on obtained information. The system estimates that the order may have to be packed in 2 boxes at a minimum. The system then recommends the packer to pack 3 items into each box (with each box weighing 30 lbs) to minimize the cost of shipping the order by carrier B.